REMARKS

By this amendment the specification and claims 1, 8, and 9 have been amended and claims 17 and 18 have been added. Claims 1-18 remain pending. Reconsideration of the application as amended is respectfully requested.

Objection to the Specification

The amendment to the specification overcomes the Examiner's rejection of the specification.

Rejections under 35 USC §112

Claims 1, 8, and 9 have been rejected under 35 USC §112 as not having support for the negative limitation "in the absence of a photoresist layer." While the limitation is believed to be sufficiently described in the specification to demonstrate the applicant had, at the time of filing, the invention as claimed, the limitation has been removed in the interest of advancing prosecution. The amendments overcome the Examiner's rejections under 35 USC §112.

Claims 1, 8, and 9 have been rejected as the Examiner states that the limitation "said etchant comprises at least about 75% of said oxygen and less than about 25% of said one of CHF_3 and CH_2F_2" cannot be found. The Examiner recognizes that the applicants disclose the flow rate ratio of O_2:CHF_3 or O_2:CH_2F_2 of greater than about 3:1, for example at paragraph [0010]. As the Examiner states in a previous office action, the conversion from ratios to percentages is easily performed by one of ordinary skill in the art. The claims have been amended to include the language "greater than about 75% of said oxygen" from the previous "at least about..." to more closely conform to the precise language of paragraph [0010]. The claims as amended overcome the Examiner's rejection.

Claims 1, 2, and 8-10 have been rejected under 35 USC §112 as being indefinite. The amendments to claims 1, 8, and 9 are believed to overcome the Examiner's rejection under 35 USC §112.

Rejections under 35 USC §103

Claims 1-6 and 8-15 have been rejected under 35 USC §103(a) as being unpatentable over Matsuo et al. (US 5,994,227) in view of Yatsuda et al. (EP 0945896 A1). Matsuo discloses a method comprising etching a silicon nitride layer after a photoresist is removed in a previous step with an etch containing oxygen and CH_2F_2. Matsuo expressly teaches the inclusion of oxygen at a percentage less than 40%, because at greater than 40% the etch becomes isotropic due to the release of excessive fluorine radicals. Matsuo also recites that the O_2 percentage must be greater than about 25%, because at less than 25% the etch stops due to the formation of a protective film. At the specified O_2 range of 25% to 40%, the Si_3N_4:SiO_2 etch selectivity is between 2 (for 25% O_2) and 3 (for 40% O_2). See column 3 lines 42-52.

Yatsuda discloses an etch method comprising the use of CH_2F_2 and O_2. At FIG. 5, Yatsuda discloses a CH_2F_2/O_2 value of between about 0.2 (17% CH_2F_2, 83% O_2) and about 0.7 (45% CH_2F_2, 65% O_2). Yatsuda also states that it allows an Si_3N_4/SiO_2 etch rate of 3.5 or more (page 3 line 9).

Matsuo states their O_2 percentage must be less than 40% to result in a maximum etch selectivity of 3 to prevent isotropic etching, while Yatsuda in FIG. 5 depicts that at the maximum O_2 percent allowed by Matsuo (40%, or CH_2F_2/O_2=0.3 of FIG. 5) the selectivity is about 6. Therefore, it is not possible to combine Matsuo and Yasuda because the resulting selectivity results in isotropic etching, which is taught away from by Matsuo. Thus the combination of references to result in the present invention as claimed is possible only in hindsight using the claims of the present invention as a blueprint, which is impermissible (*Interconnect Planning Corp. v. Feil,* 774 F.2d 1132, 227 USPQ 543, Fed. Cir. 1985).

Additionally, it appears that the Examiner has not given the required convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references. Both Matsuo and Yatsuda give etch rates and selectivities as discussed above, and thus there is no reason to experiment as the results of their processes are

clearly specified. The only motivation appears to be hindsight using the claims of the present application as a blueprint, which is impermissible. While the Examiner states that it is obvious "to perform routine experiment to obtain optimal value as an expected result" and that the "result effective variables are commonly determined by routine experiment" and the "process of conducting routine optimization experiments so as to produce an expected result in obvious to one of ordinary skill in the art," none of these supplies the required motivation for combining the references to result in the present invention as now claimed. Reasoning is not given as to why either Matsuo or Yatsuda would modify their inventions in the manner of the claimed invention, if in fact it is possible to do so, other than the Examiner's assertion of "routine experiment."

Claims 7 and 16 have been rejected under 35 USC §103(a) as being unpatentable over Matsuo and Yatsuda in view of Campbell et al. (US 5,429,070). Campbell recites the variation of power between 0 watts and 3 KW and is cited to show that it is possible to have a power setting in the range of 300 W to 400 W.

Matsuo, Yatsuda, and Campbell cannot be combined to result in the present invention as claimed for the reasons discussed relative to the combination of Matsuo and Yatsuda. Further, there appears to be no motivation for adding the power range possible with the invention of Campbell, other than it is possible to do so. Without a "convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references" (MPEP §706.02j), other than the possibility of doing so (if, in fact, the combination of Matsuo and Yatsuda is possible), the combination of references is possible only in hindsight using the present claims as a blueprint, which is impermissible.

The rejected claims not individually addressed are allowable at least because they depend from an allowable base claim.

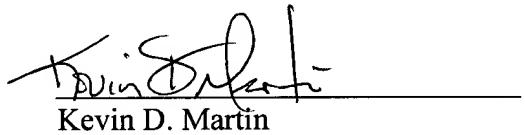
New Claims

Claims 17 and 18, which differ in the etchant gas, are allowable over the cited references as applied by the Examiner. Claims 17 and 18 specify gas flow rates, flow rate ratios, and etch rates which are novel and nonobvious over the cited references.

Conclusion

If the Examiner believes a conference would expedite prosecution of the case, the Examiner is cordially invited to call the undersigned. This is believed to be a complete response to the Examiner's office action.

Respectfully submitted,



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